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AUTHOR Palincsar, Annemarie Sullivan; And Others
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ABSTRACT

In an effort to implement a program of reciprocal teaching dialogues, 6 first-grade teachers orally presented third-grade biology lessons to a group of 6 students, most of whom were identified as at risk for academic difficulty. Teachers aimed to teach students ways to approach learning from text and increase students' understanding of biological principles embodied in several themes. Results from classification and comprehension tasks showed that in comparison with controls, children in the reciprocal teaching discussion groups improved their ability to understand text and identify the gist of passages read. They also improved their ability to recognize and apply analogical information in the texts. It was found that reciprocal teaching strategies provided a means for the children to try out their ideas. The strategies also represented language in the form of tools to be used in a public manner to solve the problems of understanding texts and their themes. Successful teachers used, with varying effectiveness, a broad array of conversational devices and opportunities to support children's discussions. The formation of a community of learners in the classrooms was promoted by two situations: (1) students worked with texts that constituted a usable and coherent body of knowledge; and (2) the texts represented a common knowledge base. (RH)

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Structured Dialogues among Communities of First Grade Learners

Annemarie Sullivan Palincsar
Michigan State University

Ann L. Brown

Joseph C. Campione
University of California at Berkeley

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Correspondence should be sent to Annemarie Palincsar, 334 Erickson Hall, Michigan State University, East Lansing, MI 48824.

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Did you know that the dots on ladybugs keep them dry? And that the sticky tongue of the chameleon enables it to hang from a tree and that furthermore, this same chameleon, dangling from the tree by its tongue, and swinging in front of a purple house, would alternate in colour between purple and the brown of the tree bark? Did you know that people were extinct but then started all over? Maybe they were helped by the fact that some people had lights on their bottoms just like fireflies do; and, they used these lights to signal their boyfriends and girlfriends. While these ideas may seem the stuff of Dr. Seuss tales or Leo Lionni fables, they are, in fact, some of the wonderfully inventive contributions recently made by first graders engaged in learning dialogues with their teachers. The purpose of these discussions was twofold: first, to teach these children ways to approach learning from text, and second, for teachers to aid their students to arrive at understandings of the biological principles embodied in the following themes: protection against enemies, natural pest control, protection from the elements, adaptation and extinction, camouflage, and mimicry.

At first blush, given the examples above, it may seem that children and their teachers were worlds apart in their common knowledge and understanding of these principles; however, in this paper we propose that the joint activity of the children and teachers engaged in making sense of these texts served to bridge shared as well as unique knowledge.

The focus of this paper is on two facilitative features of these lessons: 1) The form of discourse within which the children and teachers were operating; and 2) The role of the texts in creating a community of learners.

We begin with a description of the participants in these lessons.

The Lessons

The participants in these lessons were six first grade teachers, each of whom worked with a group of six students, the majority of whom were were identified at-risk for academic difficulty, based on teacher opinion and standardized and informal measures of listening comprehension. For example, these children typically scored below the 35th percentile on a standardized test of listening comprehension (Stanford Early School Achievement Test). For each teacher, there was also a matched control group.

The investigation began in January. In the fall of this school year, these same experimental groups participated in thirty days of reciprocal teaching instruction (to be described shortly) using expository, as well as narrative texts, written at a third grade level, that addressed a broad range of topics. As the children were non-readers, the teachers read the texts aloud, in segments, for the purpose of discussion.

In January, after almost a two-month hiatus, the children resumed reciprocal teaching discussions; however, these discussions were now focused on passages that contained analagous themes. For example, the **Protection Against Enemies** theme was presented in separate passages about porcupines, diodins, turtles, and armadillos. (See Table 1 for a list of themes and stories). Furthermore, assessment passages which were administered throughout instruction were designed to measure both comprehension as well the children's ability to recognize and use the principles presented in the discussion passages. To illustrate, the assessment passages related to **Protection Against Enemies** discussed the defense mechanisms of hedgehogs and oysters.

Following a series of pretests (described shortly), both the experimental and control students participated in three lessons designed to introduce the children to the concept, "similar" both at a concrete as well as an abstract level. The experimental groups then began their discussions. Each day, one passage was read to the children. The basic format of reciprocal teaching dialogues calls for the children and teacher to engage in questioning one another about the content of a passage as it is read in segments. In addition, with each segment, the group summarizes the content, generates predictions about upcoming text, and works to clarify ambiguous information. The children take turns leading these discussions, although responsibility for sustaining the dialogue is shared among the group members.

In presenting the first passage within each theme, the teacher was urged to first determine whether or not the children would, in the course of their discussions, focus on the content that represented the theme of that passage. If the children failed to do this, then the teachers were encouraged to make the theme of the passage explicit, following the complete reading of it. However, in subsequent passages related to the theme, the teachers were asked to foster the children's recognition of the theme and information analagous across the texts read. The following dialogue segment illustrates how this occurred in one group in the passage on polar bears from the theme **Protection from Elements**. This is the fourth story that the children have read in this theme, the previous stories included, Eskimoes, penguins, and the hippopotamus.

The children are discussing the first segment of the text which basically informs the children where polar bears can be found. The text made

no mention of the other subjects discussed in this theme and the information related to how the bear protects itself from the harsh cold has yet to be introduced but the children are already recognizing similarities between information presented thus far and information acquired in earlier readings. Missy is leading the discussion and asks: "Where do the polar bears live?" The teacher acknowledges, "That would be a good question to ask, wouldn't it?" Missy calls on Traver who answers, "They live in the snow." Several children, in unison, mention "caves" and Traver adds to his response, "They live in a kind of cave." Rodney now adds, "They live in Alaska like the Eskimoes do." Traver pipes in with, "And the penguins." The teacher says, "Good for you, you have just pointed out something that is..." but Traver interrupts with, "They (in reference to the penguins) have an ice cave too." Now Rodney interjects with yet another observation, one that leaps across themes when he notes, "And the polar bear has fur, looks like quills but it ain't quills." Troy then suggests that "[the fur] is a big glove like." From here the children made predictions that the glove of the bear could be compared to the layers of clothing discussed when reading about Eskimoes.

The children's recognition and use of thematic information was manifest in a number of ways, including the fact that the children would generate questions asking how two things were alike, summaries that included information across texts, clarifications about the ways in which two subjects were different, and numerous predictions that were predicated upon information read in prior texts. For example, in virtually each of the six groups, having discussed the way in which the walkingstick protects itself from enemies by its appearance as well as its behavior (i.e., imitating a fallen twig or leaf), the children, recognizing that the pipefish was

another creature that assumes the appearance and characteristics of the plant life within which it lives, predicted that the story would also tell them who the enemies of the pipefish were. In addition, there were numerous occasions when the children simply spontaneously interjected their discoveries and speculations, often accompanied by little squeals of delight, as though they were "in on a secret."

Independent outcomes of the lessons

At this point, we will summarize the outcomes of this investigation by discussing the results of two measures that permitted us to examine the extent to which the children acquired and independently used the knowledge presented in the texts and discussed in the dialogues. These two tasks will be referred to as classification and comprehension tasks. The pretest classification task was administered by presenting the students with a set of pictures that represented one of two themes (e.g., protection against enemies and adaptation/extinction). The children were asked to sort the pictures into two piles so that "the ones that go together are in the same pile." The children were asked to talk out loud as they thought about which pile they would put each picture into. In addition, when the children were finished sorting, they were asked once again, how they decided which pictures belonged together. This sorting task was repeated three times until each theme and its constituent subjects were sorted.

The posttest classification task was administered by presenting pictures of the objects, one at a time. The children were asked to recall information about each subject (e.g., "This is a porcupine. What do you remember about the porcupine?"). If the students mentioned the theme (i.e., that porcupines have quills that protect it from its enemies), this response

was acknowledged. If the child failed to mention the theme, the interviewer commented, "Another interesting fact about the porcupine is that it has spikes or quills all over its body to protect itself from its enemies." This procedure was repeated until piles were constituted for each of the themes and the children made decisions about the pile in which each picture should be placed. Finally, the children were presented with new examplars which they were once again asked to place in a pile with explanation. For example, the yellow jacket was described as a black and yellow flying insect that lives in the United States and likes to eat hookworms, which are harmful insects that live on tobacco plants. The results of the sorting task are presented in Figure 1. In summary, at the time of pretesting, 43% of the sorting decisions made by the experimental children were based on the physical characteristics of the objects while only 13% were made based on the thematic similarities. At the time of posttesting, 54% of the decisions were based on thematic similarities while only 29% were based on physical traits. This contrasts with the control children whose decision-making was principally guided by physical characteristics (37% of the time) and only sorted by theme 14% of the time (cf. Clark, 1983).

The second measure - the comprehension measure - was administered by reading a passage to each child and, following the reading of the passage, asking the child to respond to a series of questions. While the questions included measures of recall and inference, they also included one question designed to test the child's understanding of the theme of the passage and a second designed to measure the child's ability to identify the analogy between the subject of the assessment passage and subjects that had been discussed in class during the dialogues. These comprehension measures were

administered to the experimental and control children throughout the intervention, generally on the following schedule: following two days of dialogue on a theme, the children were administered an assessment passage that concerned yet another instantiation of the theme. The results of these comprehension assessments are presented in Figures 2 and 3. Both the experimental and control children attained 47% correct on those comprehension assessments administered prior to the thematic dialogues. The mean for the first ten days of instruction (which included discussions of three of the themes) was 49.9% for the experimental groups and 37.7% for the control groups. The mean for the second ten of instruction was 70.6% correct for the experimental groups and 39.5% for the control groups. On those questions which assessed the ability to identify the theme of the passage, the experimental students were able to do this on the average 29.2% of the time during baseline. This compares with a mean of 27.2% for the control students. Following the first ten days of dialogues, the experimental children were correctly identifying the theme of the passage 45.5% of the time, while the control students were doing so 14.9% of the time. Finally, the mean for the second half of the intervention for the experimental group was 63.9% while for the control group it was 10.5%. On those questions measuring the children's identification of the analogy between the assessment passage and an instructional passage used during the dialogues, for the first half of the instructional phase, the experimental children achieved a mean score of 53.1% while the control children achieved a mean of 27%. For the second half of instruction, the experimental children achieved a mean of 76.6% while the control children earned a mean of 17.3%.

In summary, children in the reciprocal teaching discussion groups indicated changes both in their ability to understand text and identify the gist of the passages read, as well as in their ability to recognize and apply the analogical information in the texts.

Reflections on the lessons and their outcomes

Earlier, we proposed to discuss those processes that facilitated the collaboration of these teachers and students as they explored these biological themes. The literature is rich with references to the phenomenon whereby "the individual response emerges from the form of collective life" (Rogoff & Wertsch, 1984). This phenomenon has been identified in many ways. Bruner (1984), for example, refers to "the negotiation of shared meaning...the teacher interacting with the children...guiding them through successive zones of proximal development." Edwards and Mercer (1987) refer to "the 'handover' of control of learning from teacher to pupil." Harre' (1987) refers to "conversation in the Vygotsky space" (p. 125). What is not abundant in the literature is an accounting of how this transpires.

In fact, the literature suggests that the "co-construction of knowledge" is one of the more controversial issues in this field of inquiry. Questions emerge in the order of "Whose knowledge is it?" (Rogers, Green & Nussbaum, in press). "Is it simply the teacher's knowledge that is being reproduced?" (Bloome, 1984) "Who's building whose building?" (Searle, 1986). How does one promote an "interaction between the teacher's meaning and those of his pupil's?" (Barnes, 1982).

Underlying these questions is the very practical as well as theoretically interesting issue of the "tension" between the child and the

curriculum. How does one achieve compromise between allowing exploration and discovery and maintaining teacher control in pursuit of predetermined curriculum goals? (cf. Edwards & Mercer, 1987; Dewey, 1902).

What we will describe are hypotheses and corroborating evidence regarding two features of the lessons that served to facilitate student/teacher collaboration in these dialogues: the form of the discourse and the nature of the texts.

The form of discourse. The literature, particularly that generated by sociolinguists and others studying classroom interactions offers many illustrations as to how true conversation among teachers and children is thwarted. The culprits include: the asymetry of power and knowledge between teacher and child (cf., Bloome & Green, 1984), sociocultural differences among children and teachers (cf. Heath, 1982; Michaels & Cook-Gumpertz, 1979); and organizational constraints in classrooms (cf. Cohen, 1986; Mehan, 1979). These observations suggest that one important key to the successful use of discourse in classrooms is to determine ways in which children can assume a voice and teachers can impart a voice to children in these dialogues. Our examinations of the transcripts, as well as interviews with the participating teachers, suggest that the discourse structure in these lessons, defined principally by the use of the four strategies (predicting, questioning, summarizing, and clarifying) served these very purposes. They provided an entre' for the students as they engaged in their roles as discussion leaders. In addition, they provided a mechanism whereby the students could collaborate.

In this investigation, it had been two months since the groups had participated in reciprocal teaching dialogues. Initially, when the

dialogues were resumed, the strategies assumed a prominent role. Indications of this include the fact that both teachers and children labeled the contributions they were about to make to the conversation. For example, on Day 2 of instruction, Ms. Johnson announced to the students: "All right. Listen as I make a summary." In that same lesson, a child in her group followed this pattern when he interrupted the question he was asking with the statement, "This is my question." In addition, teachers labelled children's contributions. For example, on Day 3, a student asks the teacher, "What's a suit of armor?" The teacher's first response is, "Would you like to have that clarified?" In these first grade groups, although the labeling of the strategies dropped out rather quickly (certainly by Day 5 for the majority of groups), the template provided by the strategies continued to be apparent but there was a shift in the flexibility with which the strategies were used; hence, if one were to proceed through the transcripts, for the initial days of instruction, questions were generally followed by summaries, followed by clarifications and predictions. This, in fact, reflects the order in which the teachers introduced the use of the strategies. Although it occurred at different points in time during the intervention, in each group there was a shift such that the use of strategies was driven by the content and the discourse itself. It is at this point that the students begin to interject predictions as well as questions, even in the midst of the teachers' oral reading. This shift signals the movement from ritualized to principled and active use of the strategies and the dialogue (Edwards & Mercer, 1987; Wertsch, 1980). Interestingly, this shift was experienced by both the teachers and students. For example, teachers who initially read the segments of text with no pauses

were observed to look up from the reading of the text at opportune times, for example, when they read information that confirmed the group's predictions. Flexible use of the strategies in the discourse was at least the case until things began to go "wrong." For example, on Day 11, when a subset of Ms. Mackey's group began to take the discussion afield (as measured by the tangential nature of the discussion as well as the fact that the discussion is now dominated by two children), Ms. Mackey interjected, "All right. I think that, boys and girls, you're just talking. We have to do four things. And we have to do them orderly." Indeed, there were times when the children, frustrated that the direction of the discourse was unclear demanded, "What is it we're doing now? Is this our summary?"

The strategies then, provided a means for the children to "try out" their ideas; however, in addition, they represented language in the form of tools (cf. Vygotsky, 1978) to be used, in a public manner, to solve the problems of understanding these texts and their inherent themes. How the teachers induced children to use these strategies as tools is equally important to understanding the outcomes of these discussions.

The first feature we discuss is the role of playfulness in drawing students into these discussions. Mrs. Mackey's group is about to listen to a story about The Porcupine. She begins the dialogue with, "Our first story is called, The Porcupine. Now, we usually predict from the title, don't we? So, obviously the story is going to be about --- what, Chris?" One of the lessons one learns early on in discussions with first graders is that there is nothing that is "obvious." Chris responds, "A porcupine has a friend that's a cactus and he has a girlfriend that's another cactus." This leads to an array of predictions from other members of the group that are largely

fantasies. Across the teachers, we observed a considerable degree of tolerance for these flights of fancy. In fact, the majority of comments made by the children that were used in the introduction to this paper, were made during the course of generating predictions about the upcoming text. Discussions with the teachers suggest that such playfulness has an important role in enticing young children to become engaged in the text as well as with the strategies. How teacher's responded to this playfulness differed. On some occasions, teachers provided the children information, such as, "Oh, what if I told you this was a true story?" while on other occasions the teachers would simply read the text and allow the children to deduce that for themselves.

The second feature that we discuss is the support provided by the teacher to maintain the children's engagement in the dialogues. Griffin and Cole (1984) draw our attention to the fact that the support that adults provide in the ZPD is not necessarily of amount but of kind. Indeed, our examinations of the transcripts revealed that successful teachers called upon a broad array of conversational devices and opportunities to support these young children's discussions; even within one lesson, and certainly across lessons, teachers were observed to use cued elicitations, paraphrasing of children's contributions, choral responses, framing of the children's responses, selective use of praise, silence... In the classroom discourse literature, some of these devices assume a negative connotation. For example, cued elicitations and paraphrases are often associated with teacher control and the masking rather than bridging of student and teacher understanding (Edwards and Mercer, 1987). Our observations of students and teachers engaged in dialogues and evaluations of the outcomes of these

dialogues suggest that each of these devices assumes value (both negative and positive) only when examined in its complete context as defined by the children, the history of the instruction, and the text, to select a few of the variables (cf. Erickson, 1982).

The children and teachers as a community of learners. One important contrast between these lessons and earlier reciprocal teaching dialogues was the use of the thematically-arranged texts. The fact that the children were working with texts that constitute a useable, coherent, and connected body of knowledge and the fact that these texts represented a common knowledge base promoted a community of learners (see also Brown & Palincsar, 1989 AERA paper).

These features of the text led to the following two occurrences in the dialogues: (1) the children focused on the analogy, and (2) they cross referenced texts. For example, one group was discussing the Snowshoe Rabbit. They had learned that this rabbit changes color in the winter and were generating their predictions about the upcoming text when Traver suggested: "About, probably like...probably he might get extinct?" This is interesting because the Snowshoe Rabbit was presented in the context of Camoflage and yet Traver made the connection between camoflage as a means of preservation and the consequence of not having such a means - extinction. (There is an interesting aside to this annecdote - testimony to the fragile nature of these children's understandings. At the end of the lesson, the teacher made use of Traver's mentioning the theme of extinction and asked the children, "Why do you suppose the Snowshoe Rabbits are not extinct?." She immediately called on Traver who answered: "Probably smart like a dog.

(!)" However, a second child in the group piped up with, "Because he can change colours and blend in.")

Interestingly, the children not only made references to texts within and across the themes but, additionally, made reference to texts that they had read months before this study began in the previous reciprocal teaching intervention. For example, in their discussion of the ladybug text, one paragraph, without any previous mention of hibernation or how the ladybug spends winter begins, "The following spring, the ladybugs come out of their deep sleep." In the accompanying discussion, the children compare the ladybug's hibernation with what they had learned in a story entitled, "Black Bear Babies" which was actually written more in a narrative genre and which they had listened to approximately three months prior to this discussion. This is particularly noteworthy since we have no evidence of children incorporating previous texts in their discussions before we began this investigation. The extension of reciprocal teaching discussions to texts with recurrent themes gave rise to a shift from learning how to learn from text to learning how to use knowledge acquired from text.

One final note about becoming a community of learners is the observation that, on several occasions the children made references to themselves as part of these groups as well as to the contributions they made to these groups. In the words of one youngster, "Amy and Me are good rememberers. We are the rememberers in this group."

Conclusion

Dewey (1902), an American contemporary of Vygotsky urged that if educators,

> "Abandon the notion of subject-matter as something fixed and ready-made in itself, outside the child's experience; cease thinking of the child's experience as also something hard and fast; see it as something fluent, embryonic, vital; ... [then we would] realize that the child and the curriculum are simply two limits which define a single process." He urged that, "Just as two points define a straight line, so the present standpoint of the child and the facts and truths of studies define instruction. [Instruction] is continuous reconstruction, moving from the child's present experience out into that represented by the organized bodies of truth that we call studies" (p. 11).

In this paper we have described the role that student teacher dialogues play in this reconstruction, facilitated by a specialized form of discourse, in hand with the use of usable, coherent, and connected topics of discussion.

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Topics and Texts

I. PROTECTION AGAINST ENEMIES

Instruction	Assessment
Porcupine	Hedgehog
Diodin	
Turtles	Oysters
Armadillos	

II. NATURAL PEST CONTROL

Instruction	Assessment
Garden Hunter	Praying Mantis
Ladybugs	

III. PROTECTION FROM ELEMENTS

Instruction	Assessment
Eskimos	Desert People
Penguins	
Hippo	Elephant Seal
Polar Bear	

IV. ADAPTATION/EXTINCTION

Instruction	Assessment
Wooly Mammoth	Dinosaurs
Tasmanian Tiger	
Auk	Dodo Bird
Sabre-tooth Tiger	

V. CAMOUFLAGE

Instruction	Assessment
Chameleon	Tree Frogs
Snowshoe Rabbit	Arctic Fox

VI. MIMICRY

Instruction	Assessment
Walkingstick	Io Silkmoth
Pipe Fish	
Viceroy Butterfly	Capricorn Beetle
Hawkmoth Caterpillar	

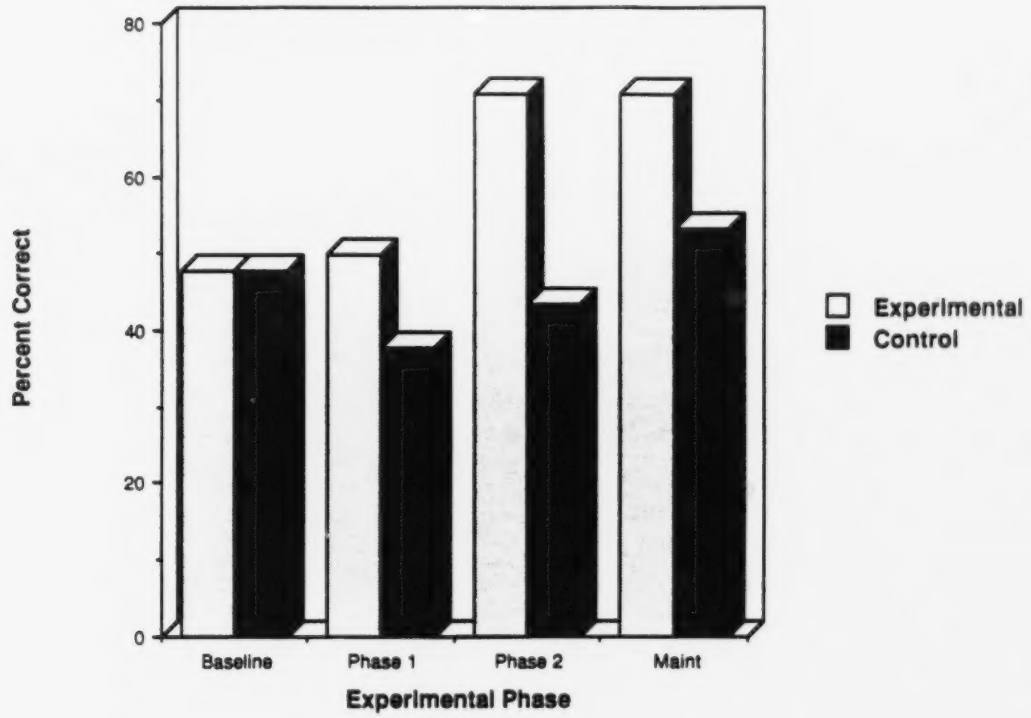
BASELINE MEASURES

1. Tadpoles	2. Purple Martins

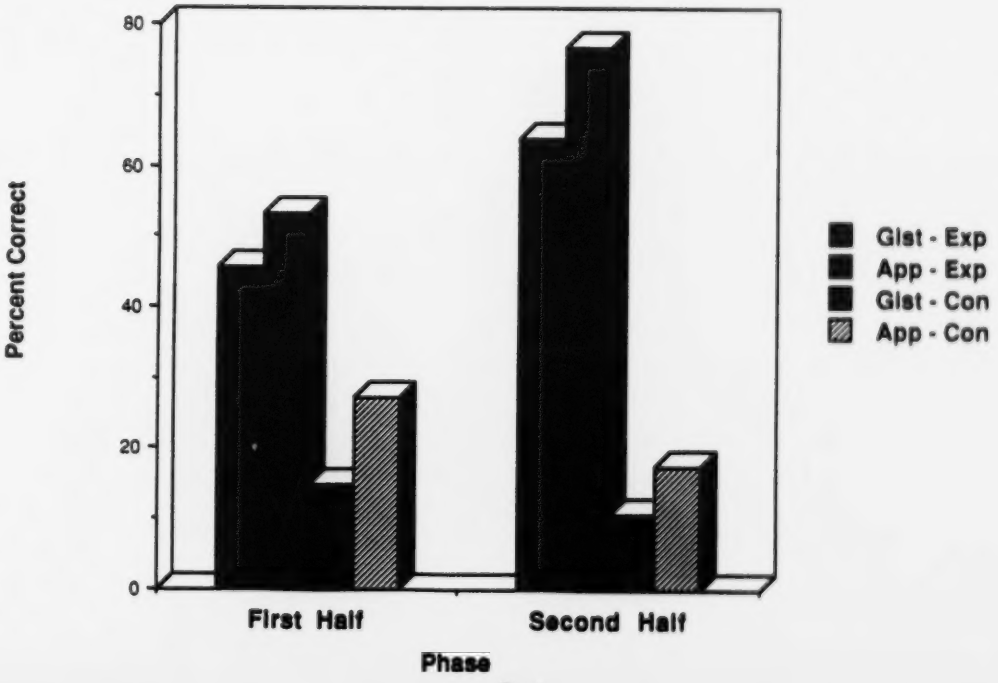
MAINTENANCE MEASURES

1. Mealy Bugs	2. Treehoppers

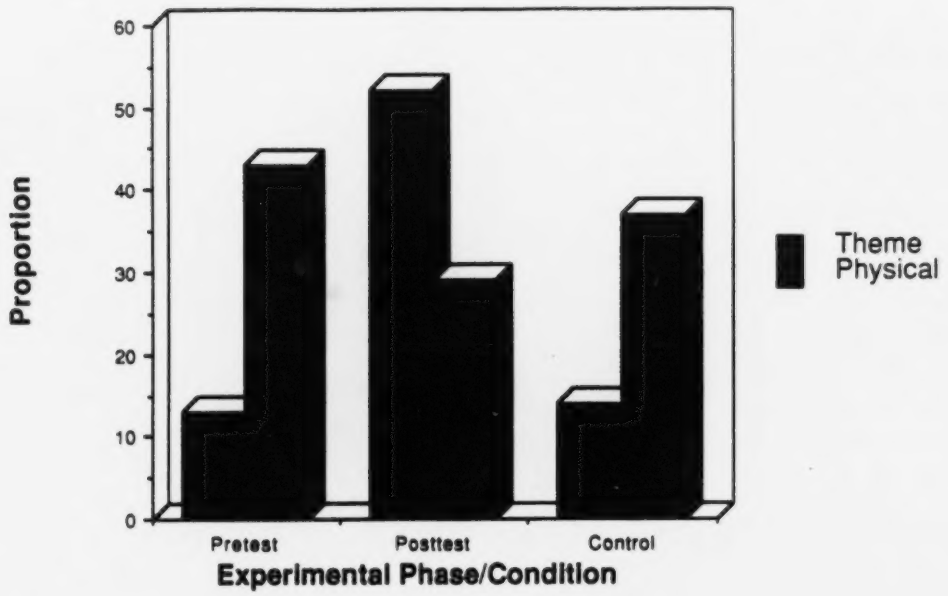
Biological Themes -- Daily Assessments



Gist and Application Items



Biological Themes Classification Results
Proportion of Stimuli Selected
as a Function of Type



Biological Themes -- Transfer Scores